REMARKS

Claims 1, 2 and 4 to 18 are all the claims pending in the application, prior to the present Amendment.

The Examiner sets forth new grounds of rejection and states that applicants' amendment necessitated the new ground of rejection. Applicants submit, however, that the finality of the present Office Action is in error. The only amendment that applicants made to claim 1 was the incorporation of claim 3. Thus, the amendments did not necessitate a new ground of rejection. Accordingly, applicants request the Examiner to withdraw the finality of the present Office Action.

Claims 1-8 and 10-18 have been rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent 6,878,459 to Takahashi et al, in view of U.S. Published Patent Application 2002/0150796 to Kanbe et al, and further in view of the newly cited U.S. Patent 6,541,125 to Futamoto et al.

Applicants submit that Takahashi et al, Kanbe et al and Futamoto et al do not disclose or render obvious the subject matter set forth in the present claims and, accordingly, request withdrawal of this rejection.

The Examiner's detailed statement is essentially the same as the Examiner's previous rejection based on Takahashi et al and Kanbe et al, except that the Examiner now relies on the newly cited Futamoto et al patent for a disclosure of an Mn content of 3-25 atomic % in a Co-Cr-Mn underlayer.

The present invention as set forth in claim 1 as amended above is directed to a magnetic recording medium comprising an orientation adjusting layer, a nonmagnetic under layer, a nonmagnetic intermediate layer, a magnetic layer and a protective layer sequentially stacked on a

nonmagnetic substrate provided on a first surface thereof with a texture streak and used for a magnetic disc, wherein the nonmagnetic under layer contains at least a layer formed of a Cr-Mn-based alloy and possesses magnetic anisotropy having an axis of easy magnetization in a circumferential direction thereof, and wherein the layer of Cr-Mn-based alloy that forms at least part of the nonmagnetic under layer has an Mn content in a range of 1 to 60 at%, and wherein the nonmagnetic underlayer contains at least a layer formed of a Cr-Mn-based alloy and a layer formed of a Cr-Mo-based alloy formed thereon, and the Cr-Mn-based alloy has Cr as a first main component and Mn as a second main component, and the Cr-Mo-based alloy has Cr as a first main component and Mo as a second main component the nonmagnetic under layer at least possesses a stacked structure consisting of a Cr-Mn-based alloy layer and a Cr-Mo-based alloy layer formed thereon.

Thus, applicants have amended claim 1 to recite that the nonmagnetic underlayer contains at least a layer formed of a Cr-Mn-based alloy and a layer formed of a Cr-Mo-based alloy formed thereon, and the Cr-Mn-based alloy has Cr as a first main component and Mn as a second main component, and the Cr-Mo-based alloy has Cr as a first main component and Mo as a second main component. Support for this amendment can be found in original claim 5 and the working examples of the present specification. Applicants have canceled claim 5.

Applicants have also amended claim 4 to recite that the layer of Cr-Mn-based alloy that forms at least part of the nonmagnetic under layer has a BCC structure. Support for this amendment can be found at page 10, lines 9-10.

Due to the above-described configuration, the magnetic recording medium of the present invention of the present application is excellent in terms of magnetic properties and recording and reproducing properties.

For example, as shown in Table 1 at page 22 of the present specification, the magnetic recording medium of the Examples of the present invention have a coercive force of 3.8 kOe to 4.1 kOe, a magnetic anisotropy of 1.32 to 1.70, and a SNR (signal/noise ratio) of 17.1 to 18.1.

Takahashi et al disclose a magnetic recording medium comprised of a non-magnetic base material 1 comprised of a substrate 1a and a non-magnetic layer 1b, such as a Ni-P film. A texture can be applied to Ni-P non-magnetic layer 1b. A metal underlayer 2 is formed on top of the base material 1. The metal underlayer is a multi-layered structure formed by sequentially forming a first underfilm 2a and a second underfilm 2b. A ferromagnetic metal layer 3 is then formed on top of the metal underlayer 2.

Takahashi et al do not disclose or suggest providing an orientation adjusting layer, a non-magnetic under layer comprised of a layer of a Cr-Mn based alloy and a layer of Cr-Mo based alloy, and a nonmagnetic intermediate layer on a non-magnetic substrate. Takahashi et al provide underfilms 2a and 2b, but these two underfilms of Takahashi et al do not satisfy the recitations of claim 1 of an orientation adjusting layer, an underfilm of a Cr-Mn based alloy, an underfilm of a Cr-Mo based alloy and a nonmagnetic intermediate layer.

In the Office Action, the examiner states: "As to Claim 1, 2, & 4, Takahashi et al '459 discloses a non-magnetic base material (35) two metal underlayers of a Cr-Mn alloy (38) and a ferromagnetic metal layer followed by a protective layer (3-4). Col. 4, lines 44-67."

Applicants note that the numbers "(35)" and "(38)" that the Examiner refers to nowhere appear in Takahashi et al. Further, Takahashi et al nowhere disclose "two metal underlayers of a Cr-Mn alloy."

As discussed above, Takahashi et al '459 disclose a metal underlayer 2 formed of a first underfilm 2a and a second underfilm 2b. See Fig. 1 and col. 9, lines 1-6.

Further, Takahashi et al '459 disclose the following at column 9, lines 14-21:

> The aforementioned underfilms 2a, 2b should preferably utilize Cr or a Cr alloy, and CrMo alloy and CrW alloy are particularly preferred. Furthermore, examples of other Cr alloys which offer similar effects to the CrMo alloy and CrW alloy mentioned above include alloys of Cr with either one, or two or more elements selected from the group of elements comprising V, Nb, Hf, Zr, Ti, Mn, Ta, Ru, Re, Os, Ir, Rh, Pd, Pt, P, B, Si, Ge, N and O. Cr or any of these Cr alloys, provided they are used in a combination of materials with different lattice constants, can be suitably applied to either of the underfilms 2a and 2b.

Thus, Mn is disclosed as one of a number of elements that can be used in Cr alloy underfilm 2a or 2b, but Takahashi et al do not contain any example of such a use.

Examples 1-5 of Takahashi et al '459 are all of the working Examples disclosed in Takahashi et al '459, and contain 102 samples. In all of these 102 samples, there is no sample having a first underfilm formed of a Cr alloy. See Tables 2, 4, 6, 7 and 8 of Takahashi et al '459. In each of the 102 samples of Takahashi et al '459, the first underfilm is formed of Cr or is not present, and is not formed of a Cr alloy, and thus is not formed of a Cr-Mn alloy.

Also, among the 102 samples in Examples 1-5, there is no sample in which a Cr alloy containing Mn forms the second underfilm 2b of Takahashi et al '459.

The first underfilm in each sample of Takahashi et al is formed of a Cr film having a thickness within a range of 0 to 10 nm, or is not present. Also, the second underfilm 2b of each

sample disclosed in Examples 1-5 of Takahashi et al '459 is either a CrMo alloy or a CrW alloy, or is not present.

Thus, Takahashi et al do not disclose or suggest providing an orientation adjusting layer, a non-magnetic under layer comprised of a layer of a Cr-Mn based alloy and a layer of Cr-Mo based alloy, and a nonmagnetic intermediate layer on a non-magnetic substrate.

Turning now to Kanbe et al, it does not supply the deficiencies of Takahashi et al.

The Examiner has relied on Kanbe et al for a teaching in paragraph [0020] of a Cr alloy underlayer in a magnetic recording layer media and a teaching in paragraph [0092] of a magnetic anisotropy in a circumferential direction. The Examiner states that Kanbe et al disclose the use of Mn in the first underlayer in order to optimize flux, but do not disclose applicants' claimed range of atomic percent.

Kanbe et al disclose a magnetic recoding medium comprised of a substrate and a magnetic layer formed on either a single underlayer or on a plurality of underlayers (e.g., a first underlayer and a second underlayer) formed on a substrate.

In paragraph [0019], Kanbe et al disclose that the first underlayer can be an alloy of Co and at least one additive element selected from a "first group" consisting essentially of Ti, Yi, Zr, Nb, Mo, Ht, Ta, No, Si and B. In paragraph [0020], Kanbe et al further disclose that a second additive element from a "second group" of Cr, V and Mn can be added to the first underlayer. Nowhere do Kanbe et al disclose or suggest a first underlayer of a CrMn alloy as set forth in the present claims.

Further, paragraph [0092] that has been referred to by the Examiner occurs in Embodiment 9 of Kanbe et al which employed a CrTiB single underlayer on a NiP/A1 alloy substrate.

The above-described first and second underlayers in Kanbe et al do not correspond to and do not suggest the nonmagnetic underlayer of the present invention which is comprised of a CrMn first underlayer and a CrMo second underlayer which are between an orientation adjusting layer and a nonmagnetic intermediate layer. Accordingly, the combination of the teachings of Takahashi et al '459 with those of Kanbe et al would not have led one of ordinary skill in the art to the subject matter of the present claims.

Turning now to Futamoto et al, it discloses a magnetic recording medium comprised of a substrate, an underlayer provided on the substrate, and a Co alloy magnetic film formed on the underlayer, wherein the underlayer has a two-layer structure comprised of a lower underlayer which is in contact with the substrate and an upper underlayer in contact with the Co alloy magnetic film. See column 2, lines 54-60.

The lower underlayer is used to control the orientation and grain size of the crystal of the magnetic film and can be made of a material having a B2 type crystal structure of an NiAl, FeAl, FeV, CaZn, CoAl or a CuPd ordered phase, or a material having a bcc structure of Cr, Cr-Ti, Cr-Mo, Cr-No, Cr-Nb, or Cr-V. See column 4, lines 4-12.

The upper underlayer which is in contact with the magnetic film is made of a Co-Cr_x-M_y alloy having an hcp structure. M is a non-magnetic element selected from a large number of elements, one of which is Mn. See column 2, lines 61 to column 3, line 1. Mn can be present in the upper underlayer in an amount of 3 to 25 at %. See column 5, line 31.

Thus, Futamoto et al '125 do not disclose that a lower underlayer may be made of the Cr-Mn alloy, but instead discloses that the lower underlayer may preferably be made of Cr, Cr-Mo and Cr-W. See column 4, lines 4-12.

Further, in the present invention, the magnetic layer is not directly formed on the layer made of the Co-Cr_x-M_y based alloy, where M can be Mn, as in Futamoto et al '125, but is formed on a non-magnetic intermediate layer.

Accordingly, the above-described first and second layers in Futamoto et al do not correspond to and do not suggest the structure and composition of the present invention in which a nonmagnetic underlayer which is comprised of a CrMn first underlayer and a CrMo second underlayer is between an orientation adjusting layer and a nonmagnetic intermediate layer. Therefore, the combination of the teachings of Takahashi et al '459, Kanbe et al and Futamoto et al '125 would not have led one of ordinary skill in the art to the present invention.

As described above, the laminated structure of the magnetic recording medium of the invention of the present application is not disclosed or suggested in any of the above-described cited references.

Due to the above-described differences in configuration, the magnetic recording medium of the present invention is comprehensively more excellent than that of the above-described cited references in terms of magnetic properties and recording and reproducing properties.

Thus, as mentioned above, Table 1 at page 22 of the present application discloses magnetic recording media having a coercive force of 3.8 kOe to 4.1 kOe, a magnetic anisotropy of 1.32 to 1.70, and a SNR (signal/noise ratio) of 17.1 to 18.1.

On the other hand, although paragraph [0092) of Kanbe et al discloses that the magnetic anisotropy of the magnetic recording medium is 1.4 to 1.6, according to the Tables 1, 2, 4 and 5 of Kanbe et al, each recording medium has the coercive force less than 3.0 kpe. Further, the SNR is not indicated.

In addition, Takahashi et al '459 disclose the measurement results of the coercive forces of the samples 1-102 of the magnetic recording medium. However, the coercive forces of the samples are less than 3.4 kOe, and the magnetic anisotropy and SNR (signal/noise ratio) are not indicated.

Further, although Futamoto et al '125 disclose a magnetic recording medium having a coercive force of 4.1 kOe (Table 4, No. 17) when a CrTi lower underlayer and a CoRuCo upper underlayer were employed, the magnetic anisotropy and the SNR are not measured, and no information is provided for a CrMn lower underlayer and a CrMo upper underlayer. As is clear from the magnetic recording medium disclosed in Kanbe et al and the data of Comparative Examples 1 and 2 in the Table 1 of the present specification, magnetic anisotropy and the SNR do not necessarily depend on the size of the coercive force. Therefore, the magnetic properties and recording and reproducing properties of Futamoto et al '125 are not clear.

In view of the above, applicants submit that Takahashi et al, Kanbe et al and Futamoto et al do not disclose or render obvious the subject matter set forth in the present claims and, accordingly, request withdrawal of this rejection.

Claim 9 has been rejected under 35 U.S.C. § 103(a) as obvious over Takahashi, et al, Kanbe et al and Futamoto et al, and further in view of the newly cited U.S. Patent 6,821,653 to Fukushima et al.

Claim 9 depends from claim 1. As discussed above, Takahashi et al, Kanbe et al, and Futamoto et al do not disclose or render obvious the subject matter set forth in the claim 1. Accordingly, claim 9 is patentable over these references for the same reasons as discussed above in connection with claim 1. Fukushima et al do not supply the above discussed deficiencies of the above references.

In view of the above, applicants submit that Takahashi et al, Kanbe et al, Futamoto et al and Fukushima et al do not disclose or render obvious the subject matter set forth in the present claims and, accordingly, request withdrawal of this rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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